Claims

1. A method of identifying beam images of a beam matrix, comprising the steps of:

receiving a plurality of light beams of a beam matrix after reflection from a surface of a target, wherein the beam matrix is arranged in rows and columns;

locating a reference light beam in the beam matrix;

locating a row pivot beam in the beam matrix based on the reference beam;

locating remaining reference row beams of a reference row that includes the row pivot beam and the reference beam;

locating a column pivot beam in the beam matrix based on the reference beam;

locating remaining reference column beams of a reference column that includes the column pivot beam and the reference beam; and

locating remaining ones of the light beams in the beam matrix.

2. The method of claim 1, wherein the surface of the target has a substantially uniform reflectivity and further including the step of:

directing the plurality of light beams toward the target, wherein the plurality of light beams produce the beam matrix on the surface of the target;

3. The method of claim 1, further including the step of:

determining boundaries of the beam matrix.

4. The method of claim 1, further including the step of:

labeling the beams of the beam matrix with conventional beam labels.

5. The method of claim 1, wherein the surface of the target is substantially planar and has substantially uniform reflectivity.

6. The method of claim 1, wherein the step of locating a reference beam in the beam matrix includes the steps of:

providing an initial search window centered approximated a center of the beam matrix; and

locating the reference beam, where the reference beam corresponds to the light beam within the search window whose one-dimensional energy is the greatest.

7. The method of claim 6, wherein the step of locating the reference beam includes the additional steps of:

calculating a center of gravity of the reference beam;

providing an isolated search window centered about the center of gravity of the reference beam; and

updating the center of gravity of the reference beam.

8. The method of claim 1, wherein the light beams of the beam matrix are arranged in seven rows and fifteen columns.

9. An object surface characterization system for characterizing a surface of a target, the system comprising:

a light projector;

a camera;

a processor coupled to the light projector and the camera; and

a memory subsystem coupled to the processor, the memory subsystem storing code that when executed by the processor instructs the processor to perform the steps of:

directing the light projector to provide a plurality of light beams arranged in a beam matrix of rows and columns, wherein the light beams

impinge on the surface of the target and are reflected from the surface of the target;

directing the camera to capture the plurality of light beams of the beam matrix after reflection from the surface of the target;

locating a reference light beam in the captured beam matrix;

locating a row pivot beam in the captured beam matrix based on the reference beam;

locating remaining reference row beams of a reference row that includes the row pivot beam and the reference beam;

locating a column pivot beam in the captured beam matrix based on the reference beam;

locating remaining reference column beams of a reference column that includes the column pivot beam and the reference beam; and

locating remaining ones of the light beams in the beam matrix.

10. The system of claim 9, wherein the surface of the target has a substantially uniform reflectivity.

11. The system of claim 9, wherein the memory subsystem stores additional code for causing the processor to perform the additional step of:

determining boundaries of the captured beam matrix.

12. The system of claim 9, wherein the memory subsystem stores additional code for causing the processor to perform the additional step of:

labeling the beams of the beam matrix with conventional beam labels.

13. The system of claim 9, wherein the surface of the target is substantially planar and has substantially uniform reflectivity.

14. The system of claim 9, wherein the step of locating a reference beam in the captured beam matrix includes the steps of:

providing an initial search window centered approximated a center of the captured beam matrix; and

locating the reference beam, where the reference beam corresponds to the light beam within the search window whose one-dimensional energy is the greatest.

15. The system of claim 14, wherein the step of locating the reference beam includes the additional steps of:

calculating a center of gravity of the reference beam;

providing an isolated search window centered about the center of gravity of the reference beam; and

updating the center of gravity of the reference beam.

16. The system of claim 9, wherein the light beams of the beam matrix are arranged in seven rows and fifteen columns.

17. An object surface characterization system for characterizing a surface of a target, the system comprising:

a light projector;

a camera;

a processor coupled to the light projector and the camera; and

a memory subsystem coupled to the processor, the memory subsystem storing code that when executed by the processor instructs the processor to perform the steps of:

directing the light projector to provide a plurality of light beams arranged in a beam matrix of rows and columns, wherein the light beams

impinge on the surface of the target and are reflected from the surface of the target;

directing the camera to capture the plurality of light beams of the beam matrix after reflection from the surface of the target;

locating a reference light beam in the captured beam matrix;

locating a row pivot beam in the captured beam matrix based on the reference beam;

locating remaining reference row beams of a reference row that includes the row pivot beam and the reference beam;

locating a column pivot beam in the captured beam matrix based on the reference beam;

locating remaining reference column beams of a reference column that includes the column pivot beam and the reference beam; and

locating remaining ones of the light beams in the beam matrix, wherein the surface of the target has a uniform reflectivity.

18. The system of claim 17, wherein the memory subsystem stores additional code for causing the processor to perform the additional step of:

determining boundaries of the captured beam matrix.

19. The system of claim 17, wherein the memory subsystem stores additional code for causing the processor to perform the additional step of:

labeling the beams of the beam matrix with conventional beam labels.

20. The system of claim 17, wherein the step of locating a reference beam in the captured beam matrix includes the steps of:

providing an initial search window centered approximated a center of the captured beam matrix; and

locating the reference beam, where the reference beam corresponds to the light beam within the search window whose one-dimensional energy is the greatest.

21. The system of claim 20, wherein the step of locating the reference beam includes the additional steps of:

calculating a center of gravity of the reference beam;

providing an isolated search window centered about the center of gravity of the reference beam; and

updating the center of gravity of the reference beam.